



Governmental Unit Boundary Data Content Standard (Working Draft, Version 2.0.1)

Subcommittee on Cultural and Demographic Data
Federal Geographic Data Committee

June, 2002

Federal Geographic Data Committee
Department of Agriculture • Department of Commerce • Department of Defense • Department of Energy
Department of Housing and Urban Development • Department of the Interior • Department of State
Department of Transportation • Environmental Protection Agency
Federal Emergency Management Agency • Library of Congress
National Aeronautics and Space Administration • National Archives and Records Administration
Tennessee Valley Authority

Federal Geographic Data Committee

Established by Office of Management and Budget Circular A-16, the Federal Geographic Data Committee (FGDC) promotes and coordinates development, use, sharing, and dissemination of geographic data.

The FGDC is composed of representatives from the Departments of Agriculture, Commerce, Defense, Energy, Housing and Urban Development, the Interior, State, and Transportation; the Environmental Protection Agency; the Federal Emergency Management Agency; the Library of Congress; the National Aeronautics and Space Administration; the National Archives and Records Administration; and the Tennessee Valley Authority. Additional federal agencies participate on FGDC subcommittees and working groups. The Department of the Interior chairs the committee.

FGDC subcommittees work on issues related to data categories coordinated under the circular. Subcommittees establish and implement standards for data content, quality, and transfer; encourage the exchange of information and the transfer of data; and organize the collection of geographic data to reduce duplication of efforts. Working groups are established for issues that transcend data categories.

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1. INTRODUCTION

The Office of Management and Budget (OMB) Circular A-16¹ recognizes Federal agency responsibilities for spatial data categories and directs the responsible agencies to develop, through the Federal Geographic Data Committee (FGDC), standards for spatial data categories to ensure that the data produced by all agencies are compatible. Circular A-16 assigns responsibility for "... collecting, processing, and tabulating cultural (e.g., economic data and the names and boundaries of domestic governmental entities) and demographic data through its decennial, economic, agriculture, and governments censuses and related statistical activities" to the Department of Commerce. The Department of Commerce delegated the Census Bureau to fulfill its A-16 obligation for cultural and demographic data. As Chair of the FGDC Subcommittee on Cultural and Demographic Data (SCDD), the Census Bureau is sponsoring a "Governmental Unit Boundary Data Content Standard" under the auspices of the SCDD to best meet the needs of all Federal agencies and other data producers and users.

Further, Executive Order 12906² identifies a National Digital Geospatial Data Framework comprised of geospatial data "that are significant, in the determination of the FGDC, to a broad variety of users within any geographic area or nationwide." Executive Order 12906 recognizes boundary elements as one of three specific FGDC Framework elements. Governmental unit (GU) boundaries and legal entity boundaries for areas that are not GUs are an important component of the domain of boundary elements. Boundary layers are integral to geographic information systems (GIS) and serve as a fundamental base layer for many thematic datasets. A large number of data producers and users (including Federal agencies, state, local, and tribal governments, and private concerns) present data that are either directly or indirectly referenced to GUs or legal entities.

Although sets of GU and legal entity boundaries are maintained and distributed by a relatively few number of Federal agencies, individual GU and legal entity boundaries are collected from a large number of state, local, and tribal governments. The recurring need to update and maintain these boundaries and the widespread importance and use of these boundaries, coupled with the desire of many data users for up-to-date GU or legal entity boundary information, makes a common methodology for describing GU and legal entity boundaries and ease of their exchange a high priority.

1.1 Objective

¹ Office of Management and Budget (OMB) Circular No. A-16 Revised, Coordination of Surveying, Mapping, and Related Spatial Data Activities, October 19, 1990.

² U.S. Executive Office of the President, 1994, Coordinating geographic data acquisition and access: the National Spatial Data Infrastructure (Executive Order 12906): Washington, Executive Office of the President.

The purpose of the Governmental Unit Boundary Data Content Standard (the Standard) is to establish the content requirements for the collection and interchange of GU and legal entity boundary data and to facilitate their maintenance, analysis, and comparison of that information.

1.2 Scope

The Standard identifies and defines the components required for describing the content of a GU or legal entity boundary and the data needed for boundary data exchange. For purposes of efficient data exchange, this standard is applicable to specific other geographic areas (listed in Appendix C) which do not meet the strict interpretation of a GU.

1.3 Applicability

The Standard adopts the Federal Information Processing Standard (FIPS) Publication 55-3³ description of a GU as,

A legally bounded geographic entity that has the ability to have elected or appointed officials and raise revenues through taxes.

The Standard applies to all FGDC-recognized GUs. (Subclause 3.1.1 includes a complete listing of FGDC-recognized GUs.) The Standard additionally shall be applied by an organization to its organization-recognized GUs.

The Standard adopts the Federal Information Processing Standard (FIPS) Publication 55-3³ description of a legal entity as,

A geographic unit with legally defined boundaries established under Federal, State, or local law as a government unit or as an area for the administration of governmental function.

The Standard applies to legal entities that are not governmental units. Its principles may be extended to other geographic entities to facilitate the exchange of boundary data.

The Standard specifies the content necessary for the successful interchange of GU or legal entity boundary information; the Standard does not specify a particular structure for either storage or interchange of boundary files. Data producers and users may structure GU or legal entity boundary data in any desired format for their internal use.

1.4 RELATED STANDARDS

³ National Institute of Standards and Technology, March 6, 1995, Codes for Named Populated Places, primary County Divisions, and Other Locational Entities of the United States, Puerto Rico, and the Outlying Areas, FIPS PUB 55-3, U.S. Government Printing Office, Washington, D.C.

The Government Unit Boundary Data Content Standard recognizes and integrates aspects of several existing U.S. Federal and international standards.

1.4.1 FGDC Standards

Cadastral Data Content Standard for the National Spatial Data Infrastructure (FGDC-STD-003-1999) is utilized in the Standard as a reference for GU boundary components.

Content Standards for Digital Geospatial Metadata (Version 2.0) (FGDC-STD-001-1998) describes the metadata requirements to which metadata about GU boundary data files must conform.

1.4.2 FIPS Standards

FIPS Pub 55-3, Codes for Named Populated Places, primary County Divisions, and Other Locational Entities of the United States, Puerto Rico, and the Outlying Areas, provides the definitions of governmental unit and legal entity as those geographic units for which the Standard applies. These definitions are adopted by the Standard. FGDC recognized GUs and legal areas are cited in Appendix A as examples of geographic units for which the Standard could apply, but are not included in the FIPS Pub 55-3 definition.

FIPS Pub 6-4, Counties and Equivalent Entities of the United States, Its Possessions, and Associated Areas, supplies the names and codes of counties and other equivalent legal entities and statistical subdivisions of the United States. FIPS Pub 6-4 encompasses the 50 States, the District of Columbia, and possessions and associated areas. The names and codes are employed in the Standard in relation to boundary description components.

FIPS Pub 173, Spatial Data Transfer Standard (applicable parts) also adopted by the FGDC (FGDC-STD-002) is a metadata reference to GU boundary description component characteristics.

1.4.3 International Standards

ISO TC 211 19112 Geographic Information-Spatial referencing by geographic identifiers (draft) - ?

1.5 DEVELOPMENT PROCEDURES

The Subcommittee on Cultural and Demographic Data, sponsor of the Standard, initiated the creation of the Governmental Unit Boundary Data Content Standard with the submittal of the "Proposal for a National Spatial Data Infrastructure Standards Project" to the FGDC Standards Working Group in November 1997. The proposal was accepted by the FGDC and completed Public Review in April 1998 with favorable comments. Writing efforts commenced with the preparation of a working draft, the first version of which was completed in February 1999. Currently, the

Standard draft is being prepared for the review stage, in which the working draft is submitted for pre-public review.

1.6 MAINTENANCE AUTHORITY

The U.S. Department of Commerce, Census Bureau, Geography Division, maintains the Governmental Unit Boundary Data Content Standard for the Federal Geographic Data Committee. Address any questions to Chief, Geography Division, U.S. Bureau of the Census.

2.0 DEFINITIONS/SYMBOLS AND ABBREVIATIONS

For the purposes of the Standard, the following definitions, symbols, and abbreviations apply.

2.1 Definitions

2.1.1 areal - general term for two-dimensional space and encompasses territory enclosed within a particular set of lines.

2.1.2 boundary – line defining the limits of a geographic entity

NOTE: A boundary may or may not follow a visible feature and may or may not be visibly marked.

2.1.3 bounded – the condition relationship representing a GU or legal entity contained within a contiguous delimiting line.

NOTE: Applicable at the type or instance level

2.1.4 coextensive with – one-to-one areal maintenance relationship between two geographic entities or features that must have the same limits or extent

NOTE: Applicable at the instance level

2.1.5 contains nested – one-to-many areal maintenance relationship between a geographic entity or feature and others where nesting relationships are inherited

NOTE: A nesting relationship implies one geographic entity must be totally within another. Applicable at the instance level

EXAMPLE: State of Delaware contains three counties

2.1.6 composes – the condition relationship where the GU or legal entity always forms a part of another feature object.

NOTE: Composes assumes a geographic entity is contained entirely within, or encompassed by, another. Applicable at the type or instance level

2.1.7 composed of - the condition relationship where one or more topological or feature objects always are the ingredients of the GU or legal entity.

NOTE: Applicable at the type or instance level

2.1.8 conjoint – a boundary shared by two or more adjacent geographic areas

-
- 2.1.9 contiguous – descriptive of two areas that are adjacent to one another, touch at a common point, or share a boundary
- 2.1.10 governmental unit – a legally bounded geographic entity that has the ability to have elected or appointed officials and raise revenues through taxes
- 2.1.11 government unit boundary description component – element identifying and storing discrete units of information on governmental unit boundaries
- 2.1.12 instance – single representation of a feature type
- EXAMPLE: Corporate boundary of Augusta, Georgia
- 2.1.13 list relationship – maintained list of areal links between geographic entities or features
- 2.1.14 legal entity – a geographic unit with legally defined boundaries established under Federal, State, or local law as a government unit or as an area for the administration of a governmental function
- 2.1.15 maintenance relationship – common areal information that must be maintained between one or more geographic entities or features
- NOTE: Applicable at the type level
- 2.1.16 nests within – many-to-one areal maintenance relationship between geographic entities or features where one entity contains at least another entity
- NOTE: Applicable at the instance level
- 2.1.17 non-bounded – the condition relationship representing a GU or legal entity lacking a delimiting line.
- NOTE: Non-bounded is the absence of being bounded. Applicable at the type or instance level
- 2.1.18 topological relationship – spatial condition or characteristic required for creating and maintaining the internal topology of a database (or file)
- 2.1.19 type – representation of a class of real world occurrences with common characteristics

2.2 Symbols and Abbreviations

Cadastral Standard	Cadastral Data Content Standard for the National Spatial Data Infrastructure (FGDC-STD-003-1999)
FIPS PUB	Federal Information Processing Standards Publication

283	FGDC	Federal Geographic Data Committee
284	GU	governmental unit
285	Metadata Standard	Content Standards for Digital Geospatial Metadata
286		(FGDC-STD-001-1998)
287	SDTS	Spatial Data Transfer Standard (FIPS-PUB-173-1992)
288	the Standard	Governmental Unit Boundary Data Content Standard
289		

3.0 GU and Legal Entity Information, Identification, and Relationships

3.1 Information

Information about GUs and legal entities may be presented at two levels: the *Type Level* (pertaining to categories of GUs or legal entities), and the *Instance Level* (pertaining to single occurrences of a GU or legal entity).

3.2 Identification

Identification is essential for describing GU and legal entity boundaries. Identification can be at both the *Type Level* and the *Instance Level*. Examples of *Type Identification* information are the name of the standard that standardizes the identification information (if applicable), the type name, and the type definition. Examples of *Instance Identification* information are a reference to the type level identifier and the instance name.

3.3 Relationships

Equally important for describing GUs and legal entities is knowledge of their *Relationships*. Three categories of relationships are relevant: topologic, maintenance, and list relationships. The categories are applicable at either: the *Type Level*, the *Instance Level*, or both the *Type and Instance Levels*.

3.3.1 Topologic relationships are conditional or characteristic relationships that apply to GUs and legal entities. They may include relationships required for the internal topology of a database. Specifics of *Topological Relationships* are provided at the instance level. The topologic relationships or conditions applicable to GUs and legal entities are: bounded, non-bounded, composes, composed of.

Guidelines for applying topologic relationships are at the *Type Level* using *Topologic Rules*. That is, the topological relationships applicable to a GU or legal entity type are specified; for example, a type of GU must consist only of *bounded* geographic areas.

3.3.2 Maintenance relationships, required for GU and legal entity maintenance, provide some common areal information between one or more GUs or legal entities and geographic area features. Maintenance relationships are not general and cannot be generalized at the *Type Level*. Maintenance relationships are specific to instances of GUs or legal entities and linking particular GUs or legal entities to other GUs or legal entities or geographic area features. *Maintenance* is provided at the *Instance Level*. An example of a maintenance relationship is “Arlington County coextensive with Arlington Minor Civil Division coextensive with Arlington Census Designated Place.” Coincidental relationships or relationships which do not require maintenance

are excluded. The following are examples of maintenance relationships, their properties, and the required maintenance actions.

Coextensive With – A one-to-one areal maintenance relationship between two different governmental units

Properties: If A is coextensive with B, then B is coextensive with A.

If A is coextensive with B and B is coextensive with C, then A is coextensive with C.

Maintenance: If A is coextensive with B, then any change to A results in an equal change to B.

Contains Nested – A one-to-many areal maintenance relationship between different feature objects

Properties: If A contains nested B and C, then B nests within A and C nests within A.

Maintenance: If A contains nested B and C, then any change to A results in an equal change to B or C or both.

Nests Within – A many-to-one areal maintenance relationship between different feature objects

Properties: If B nests within A, then A contains nested B and at least one other of the same type feature object.

Maintenance: If B nests within A, then any areal change to B adding territory from or deleting territory to another feature object that does not nest within A, results in an equal change to A.

3.3.3 List relationships are an optional, separately maintained list of areal links between feature objects, maintained independently of the geographic and feature coverage within a database. The function of list relationships include the easy retrieval of lists of related entities from a database and the easy creation of data headings for publication. *List* relationships are maintained at the *Type Level*, including a listing of all instances of a type.

Metadata shall be provided for all governmental unit datasets exchanged. Relevant metadata elements include those about the origin of the boundary information, publication information, data quality, and effective date of the boundaries.

4.0 THE DATA CONTENT OF GU AND LEGAL ENTITY BOUNDARIES

The Standard defines a GU and legal entity boundaries and identifies the components required to describe these boundaries (the components are referred to within the Standard as the GU Boundary Description Components).

4.1 Description of a Governmental Unit

There are many variations to the definition of a governmental unit. Because of these variations, geographic entities recognized as GUs by one organization may not be acknowledged as GUs by other organizations. Section 1.3 contains the FIPS definition of a governmental unit.

Users of the Standard shall evaluate their geographic entities and determine if the entities fit the Standard's description of a GU.

4.1.1 FGDC-recognized GUs

The FGDC recognizes the following GUs and legal entities as comprising the domain of Framework GUs:

- Nations;
- States and equivalent entity (includes American Samoa, Commonwealth of the Northern Mariana Islands, Guam, Puerto Rico, U.S. Minor Outlying Islands, and the U.S. Virgin Islands);
- Counties and equivalent entity;
- Incorporated places including consolidated cities;
- County subdivisions (in 20 states and the District of Columbia);
- American Indian reservations and off-reservation trust lands (federal and state);
- American Indian tribal subdivision;
- Alaska Native village;
- Alaska Native Regional Corporations;
- Special district.

4.1.2 GU and legal entity examples

Appendix A (informative) provides examples of definitions for GUs and legal entities that are applicable to the Standard. The table is included in the Standard for informational purposes only to aid organizations in identifying their GUs and legal entities and should not be considered a definitive, exhaustive listing of GUs and legal entities.

4.2 GU Boundary Description Component Requirement

The Standard identifies the GU Boundary Description Components required to describe GU and legal entity boundaries. The GU Boundary Description Components are applicable to databases, individual datasets, dataset series, and individual GU and legal entity boundaries.

The GU Boundary Description Components may be used to describe the boundary of any geographic entity.

4.3 GU and Legal Entity Boundary Description Component Characteristics

GU Boundary Description Components shall identify and store discrete units of information. The GU Boundary Description Components are organizationally presented in three sections:

Section 1.0	References
Section 2.0	Type Information
Section 3.0	Instance Information

Each of the major sections contains subsections; sections are used to establish both organization and relationships.

Appendix B (normative) includes:

- A graphic illustration of the sections and their GU Boundary Description Components.
- A table of the sections, their GU Boundary Description Components, and the characteristics of each GU Boundary Description Component.

GU Boundary Description Components are defined by seven characteristics:

Name	A label assigned to the GU Boundary Description Component
Definition	The GU Boundary Description Component description
Obligation	<p>A descriptor indicating whether a GU Boundary Description Component shall always be present or sometimes be present (contain values). The descriptor may have the following values:</p> <p>Mandatory (M) The GU Boundary Description Component shall be present.</p> <p>Conditional (C) The GU Boundary Description Component shall be present if those documenting their GU boundary(s) determine the characteristic being described to be of importance.</p>

Optional (O) The GU Boundary Description Component may be present or not. Optional GU Boundary Description Components have been defined to provide an authoritative guide to those looking to fully document their GU Boundary(s).

Condition Specification of the condition under which the GU Boundary Description Component is mandatory for the Conditional Obligation.

Maximum Occurrences The number of instances a GU Boundary Description Component may have.

Data Type Specification of the set of distinct values for representing GU Boundary Description Components (for example: text, integer, real, or date)

Domain Values Specification of the set of distinct values for each GU Boundary Description Component

4.4 Other GUs and Legal Entities

Appendix C (informative) provides a list of governmental units and legal entities for which the Standard can be applied to facilitate the exchange of information.

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487 **5. *GU Boundary File Metadata***

488

489 *5.1 GU Boundary File Metadata Requirement*

490 *5.2 GU Boundary File Metadata Example (Normative Appendix E)*

Appendix A (Informative) GU and Legal Entity Examples

This appendix provides examples of legal GUs and legal areas that are recognized by the FGDC.

Alaska Native Regional Corporation (ANRC)

Corporate entity established to conduct both business and nonprofit affairs of Alaska Native pursuant to the Alaska Native Claims Settlement Act of 1972 (Public Law 92-203). Twelve ANRCs are geographic entities that cover most of the state of Alaska (the Annette Islands Reserve—an American Indian reservation—is excluded from any ANRC). (A thirteenth ANRC represents Alaska Native who do not live in Alaska and do not identify with any of the 12 corporations).

Entity type: Legal

American Indian Reservation

Federal American Indian reservations are areas that have been set aside by the United States for the use of tribes. The exterior boundaries of which are more particularly defined in the final tribal treaties, agreements, executive orders, federal statutes, secretarial orders, or judicial determinations. These entities are known as colonies, communities, pueblos rancherias, ranches, reservations, reserves, villages, Indian communities, and Indian villages. The Bureau of Indian Affairs maintains a list of federally recognized tribal governments. Some state governments have established reservations for tribes recognized by the state.

Entity Type: GU

American Indian Trust Land

Trust lands are areas for which the United States holds title in trust for the benefit of a tribe (tribal trust land) or for an individual Indian (individual trust land.) Trust lands can be alienated or encumbered only by the owner with the approval of the Secretary of the Interior or his/her authorized representative. Trust lands may be located on or off of a reservation.

Entity Type: GU

Barrio, Barrio-Pueblo, and Subbarrio

In Puerto Rico, these areas are legal subdivisions of a municipio. Subbarrios in 23 municipios are the primary legal subdivisions of the barrio-pueblo and some barrios. There are no geographic entity in the United States equivalent to the subbarrio.

Entity Type: Legal

Consolidated City

A consolidated government is a unit of local government for which the functions of an incorporated place and its county or minor civil division (MCD) have merged. The legal aspects of this action may result in both the primary incorporated place and the county or MCD continuing to exist as legal entities, even though the county or MCD performs few or no governmental functions and has few or no elected officials. Where this occurs, and where one or more other incorporated places in the county or MCD continue to function as separate governments, even though they have been included in the consolidated government, the primary incorporated place is referred to as a consolidated city.

Entity Type: GU

County or equivalent entity

The primary legal divisions of most states are termed “counties.” In Louisiana, these divisions are known as parishes. In Alaska, which has no counties, the statistically equivalent entities are census areas, city and boroughs (as in Juneau City and Borough), a municipality (Anchorage), and organized boroughs. In four states (Maryland, Missouri, Nevada, and Virginia), there are one or more incorporated places that are independent of any county organization and thus constitute primary divisions of their states; these incorporated places are known as “independent cities”. The District of Columbia has no primary division. In American Samoa, the primary divisions are districts and islands. In the Northern Mariana Islands, the primary subdivision is municipalities. In Puerto Rico, the primary subdivision is municipios. In the Virgin Islands, the principal islands of St. Croix, St. John, and St. Thomas are the division. Guam has no primary divisions.

Entity Type: GU

Hawaiian Home Land

Hawaiian home lands are areas held in trust for native Hawaiians by the state of Hawaii, pursuant to the Hawaiian Homes Commission Act of 1920, as amended.

Entity Type: Legal

Incorporated Place

Incorporated places are legally established in each state, under the laws of their respective states. Some examples are cities, boroughs, city and borough, municipalities, towns, and villages. In four states (Maryland, Missouri, Nevada, and Virginia), there are one or more incorporated places known as “independent cities” that are primary subdivisions of a state and legally not part of any county.

Entity Type: GU

Minor Civil Division

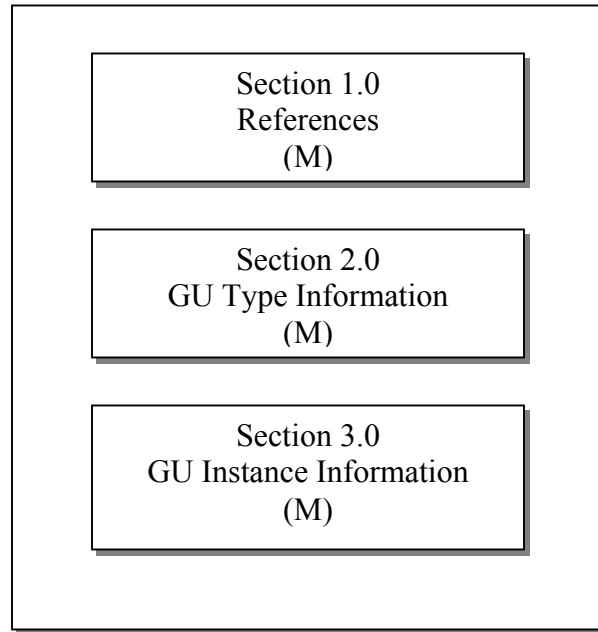
Minor civil divisions (MCDs) are the primary governmental or administrative divisions of a county in many states (parish in Louisiana). They represent many different kinds of legal entities with a wide variety of governmental and/or administrative functions. Some

examples of MCDs are assessment districts, boroughs, charter township, gores, grants, locations, magisterial districts, road districts, and townships.

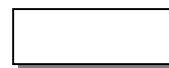
Entity Type: GU and Legal

Appendix B (Normative) GU Boundary Description Component Characteristics

OVERVIEW OF GU BOUNDARY DESCRIPTION COMPONENTS REQUIRED SECTIONS



LEGEND



Section



GU Boundary
Description Component

Obligation:

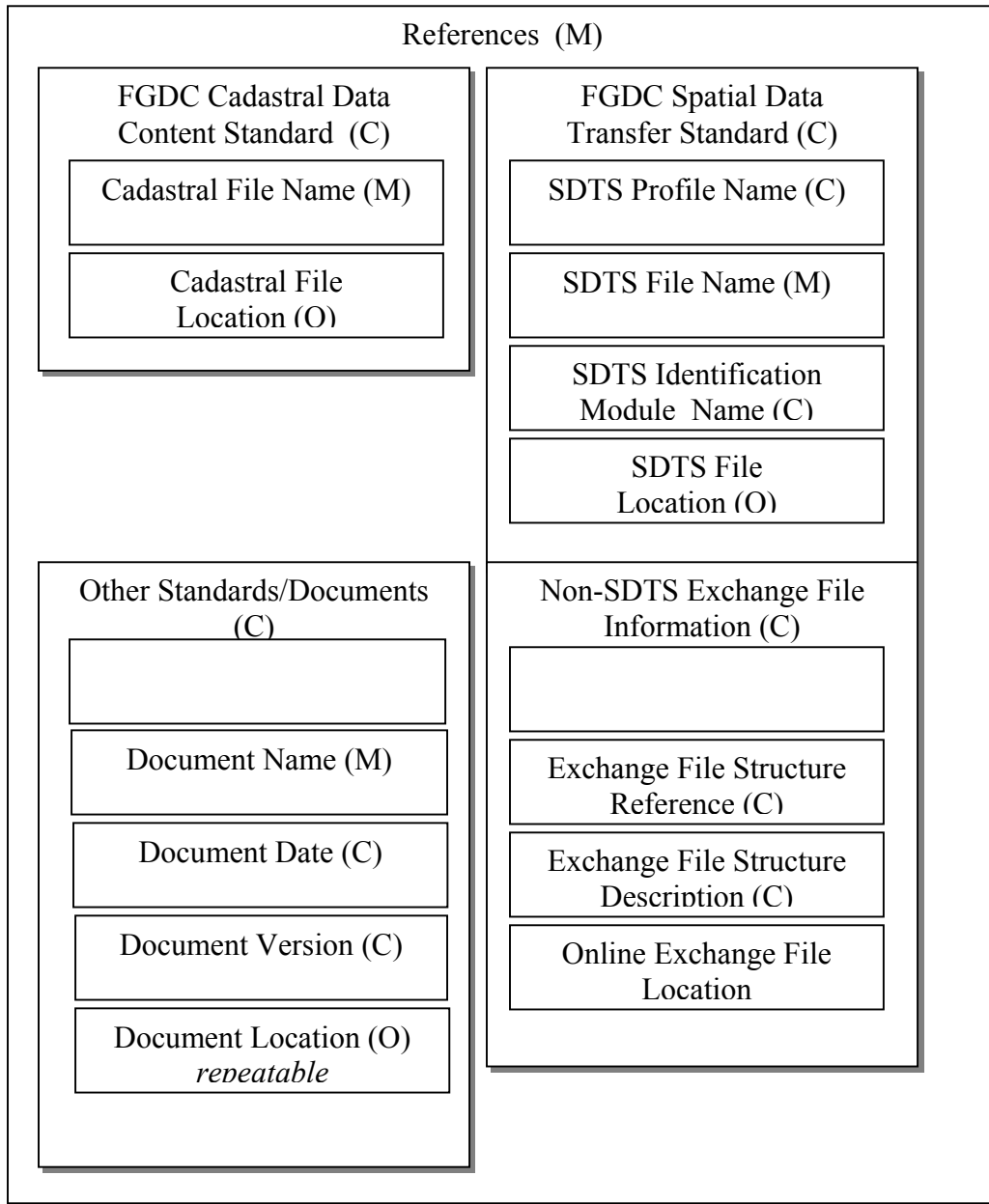
M = Mandatory

C = Conditional

O = optional

**More than one occurrence
allowed:
*repeatable***

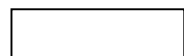
SECTION 1.0



LEGEND



Section



GU Boundary
Description Component

Obligation:

M = Mandatory

C = Conditional

O = optional

**More than one occurrence
allowed:
*repeatable***

SECTION 2.0

GU Type Information (M) *repeatable*

GU Type Identification (M)

GU Type Name (M)

GU Type Abbreviated Name (C)

GU Type Definition (M)

GU Coding System (M)

GU Type Relationships (C)

GU Type Topologic Rules (M)

Boundary Rule (M)

Boundary Feature Information (O)

Feature Coding System (C)

Feature Type Information (C) *repeatable*

Feature Type Name (M)

Feature Type Code (O)

Composes Geographic
Entity Type (O) *repeatable*

Composed Of Geographic
Entity Type (O) *repeatable*

GU List Relationships (O) *repeatable*

List Name (M)

List Information Location (O)
repeatable

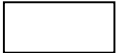
GU Type SDTS Link (C)

SDTS Module Information (M)
repeatable

Refer to Section 4

LEEND

 Section

 GU Boundary
Description Component

Obligation:

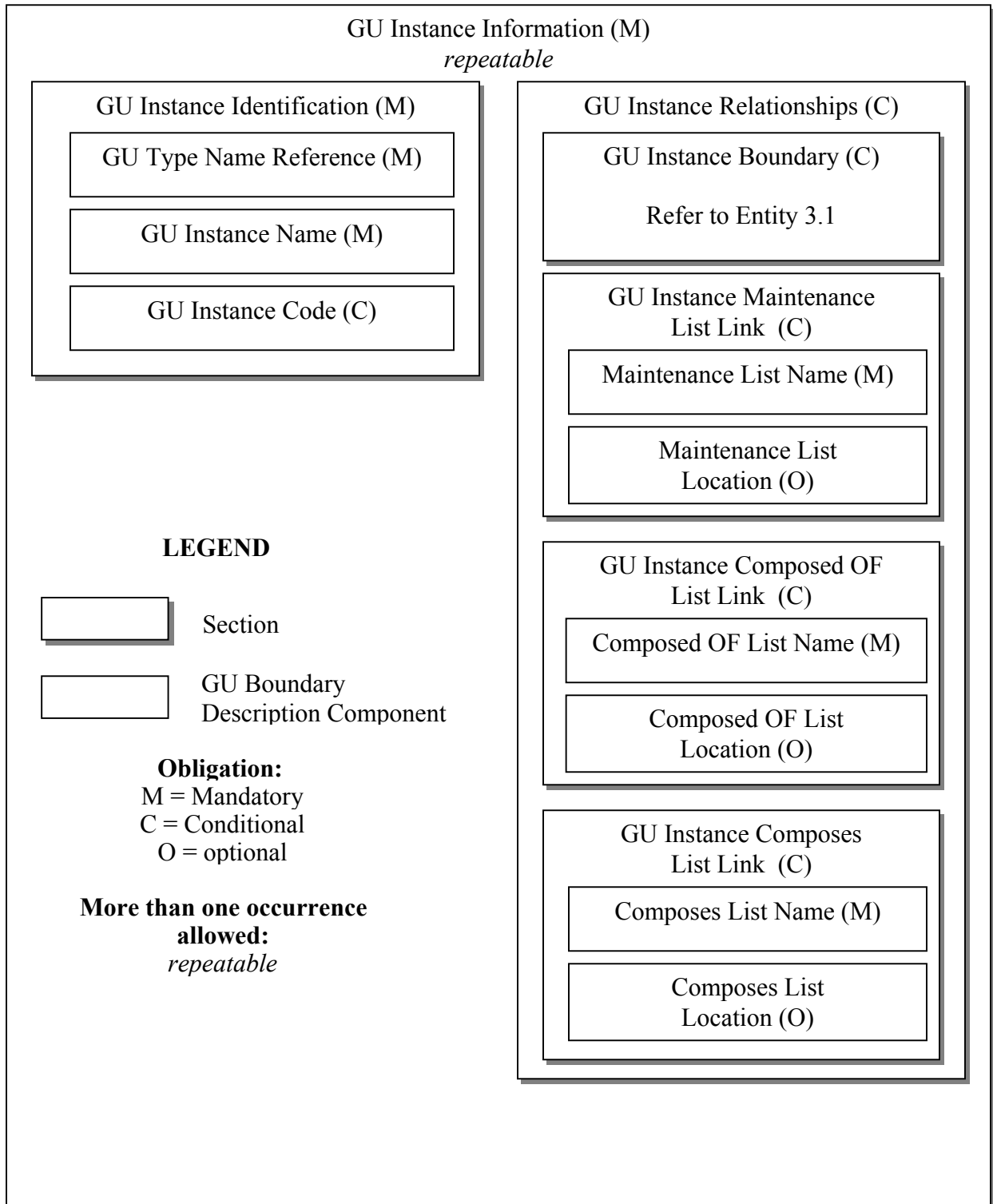
M = Mandatory

C = Conditional

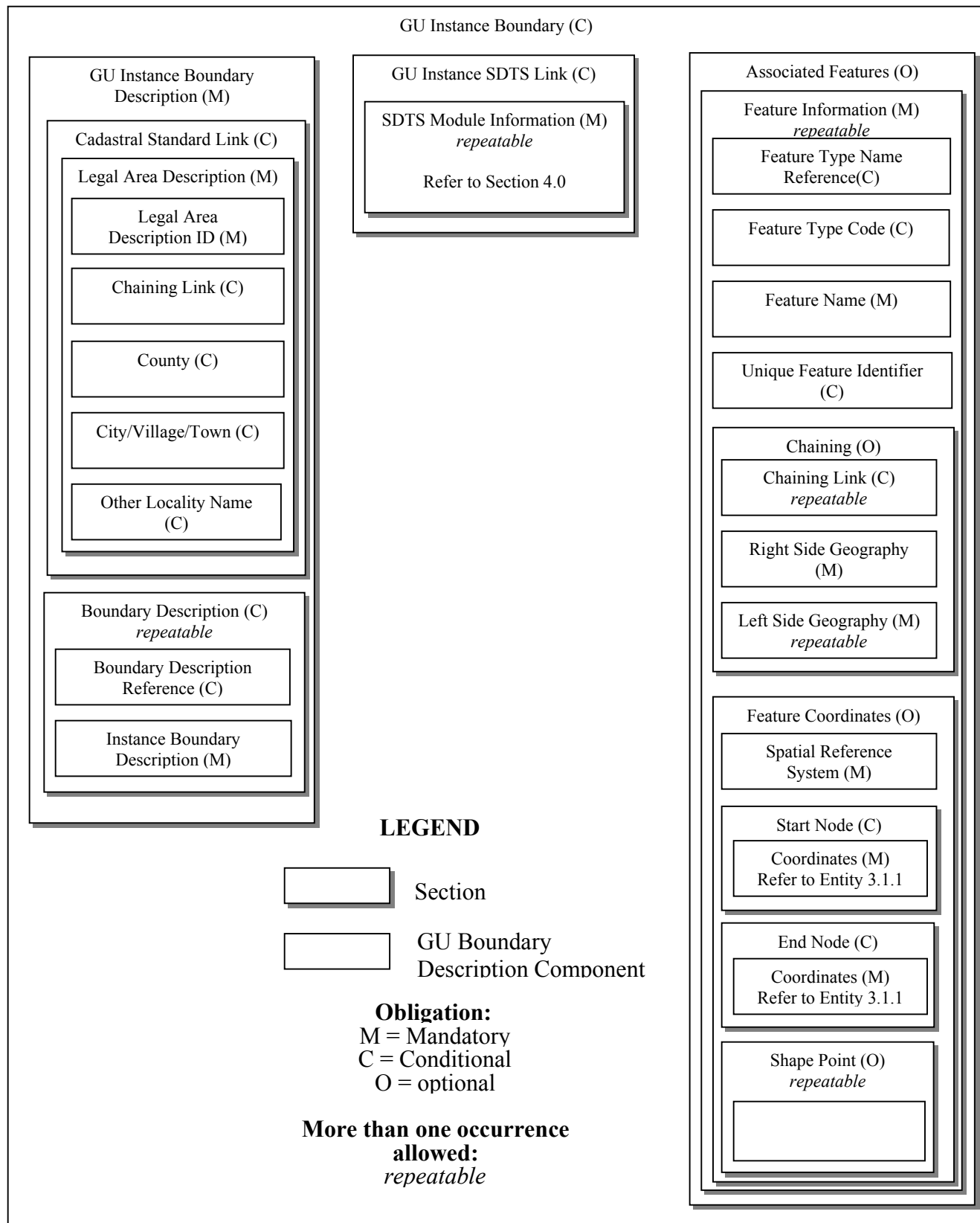
O = optional

**More than one occurrence
allowed:
*repeatable***

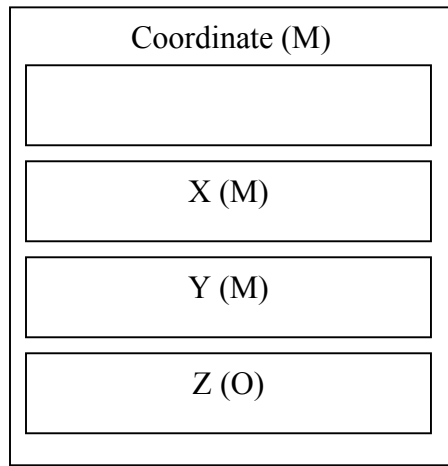
SECTION 3.0



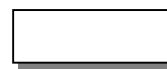
ENTITY 3.1



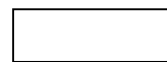
ENTITY 3.1.1



LEGEND



Section



GU Boundary
Description Component

Obligation:

M = Mandatory

C = Conditional

O = optional

**More than one occurrence
allowed:**

repeatable

Appendix C: Other GUs and Legal Entities

Appendix C provides examples of geographic areas for which the Standard can be used to exchange information but do not meet the strict interpretation of a GU or Legal Entity .

- American Indian Tribal Subdivision
- Congressional District
- State Legislative District
- Local Legislative District
- Tribal Legislative District
- Voting District/Polling District
- School District
- Special Local District
- Federally defined or owned, and managed land (National Park Service areas, Bureau of Land Management areas, National Forest Service areas)
- State owned and managed land (state parks, state game lands, legally defined traffic zones)
- Locally owned and managed land (local parks, municipal land fills)
- Tribal owned and managed land
- Federally regulated or programmatic administration area
(empowerment/enterprise zones, off-shore mineral rights, community block grant areas, qualified neighborhood areas qualifying for funding under some statute or regulation.